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TITLE: DIGITAL CORDLESS TELEPHONE SET

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ABSTRACT:

PURPOSE: To provide a digital cordless telephone set which outputs clear music of high quality even in a place distant from a sound source by transmitting and receiving the digital music signal from a digital audio equipment or an ISDN line.

CONSTITUTION: In a master machine 24, the digital music signal from a digital audio equipment 35 is inputted to a digital music signal input part 29 and is transmitted to a slave machine 37 as a radio signal from an antenna 34 through a time division multiplexing processing circuit 31 and a radio communication part 33; and in the slave machine 37, the digital music signal is outputted to the outside from a digital music signal output part 41 through an antenna 46, a radio communication part 33, and a time division multiplexing processing circuit 31, and clear music is outputted from a speaker 51 through an audio amplifier 47.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is especially equipped with the transmission function of a digital music signal about a digital cordless telephone machine.

[0002]

[Description of the Prior Art] First, conventional digital music signal-transmission equipment is explained. Drawing 5 is the block diagram of the off-talk music accepting station using the conventional public line shown in JP,4-63395,A. In drawing, 1 is a telephone-line terminal linked to the telephone line 2, and consists of the off talk music terminal 3, an FM modulation sending circuit 4, a switching circuit 5, and an antenna 6. 7 is telephone with which the usual message is presented. 8 is reception / playback block and consists of the FM receiving circuit 9, amplifier 10, a loudspeaker 11, and an antenna 12.

[0003] Moreover, drawing 6 is the block diagram of the conventional Time-Division-Multiplexing light space digital signal transmission equipment shown in JP,3-154446,A. In drawing, 13 is sources of a digital signal, such as audio equipment, 14 is a transmitting-side transceiver, and it consists of the time-division multiplexing circuit 15, a digital signal modulation circuit 16, an electric-light conversion drive circuit 17 that changes an electrical signal into a lightwave signal, and a light-emitting part 18. The electric eye to which 19 receives a lightwave signal, and 20 are receiving-side transceivers, and consist of an optical-electrical-and-electric-equipment conversion circuit 21, a digital signal demodulator circuit 22, and a Time-Division-Multiplexing separation circuit 23.

[0004] First, actuation of a music signal terminal is explained using drawing 5. In the off talk music terminal 3, when the message by telephone 7 is not performed, the analog signal which modulated digital computer information by one-way traffic through the telephone line 2 from the off talk pin center,large (not shown) is sent. Then, the off talk music terminal 3 turns off a switching circuit 5, receives the analog signal from an off talk pin center,large, and changes it into an original digital signal with an internal modem (not shown).

[0005] Internal CPU (not shown) supervises the signal, and if it identifies that it is the information from an off talk pin center,large, it will download in internal memory (not shown). And a sound source is controlled based on the information, music is generated, FM radio signal is modulated in the FM modulation circuit 4, and it is transmitted to reception / playback block 8 from an antenna 6. In reception / playback block 8, an antenna 12 receives the FM radio signal, and it gets over in the FM receiving circuit 9, it amplifies with amplifier 10, and music is generated from a loudspeaker 11.

[0006] Next, actuation of Time-Division-Multiplexing light space digital signal transmission equipment is explained using drawing 6. In the above-mentioned conventional example, although the radio signal carried out FM modulation of the analog music signal, the radio transmission of this example is carried out using light with a digital signal. Electric - light conversion is carried out in electric-light conversion drive circuit 21, and the music signal generated from the source 13 of a digital signal is sent out to space as a lightwave signal from a photogenic organ 18, after time-division multiplexing is carried out in

conformity with a fixed format in the time-division multiplexing circuit 15 in the transmitting-side transceiver 14 and a signal format required for transmission becomes irregular in the digital signal modulation circuit 16.

[0007] In the receiving-side transceiver 20, after receiving the lightwave signal by the electric eye 19 and changing a lightwave signal into an electrical signal by optical - electrical-and-electric-equipment conversion circuit 21, a required thing is separated and taken [from] out among the signals by which got over in the digital signal demodulator circuit 22, and time-division multiplexing was carried out in the Time-Division-Multiplexing separation circuit 23. After outputting this from the receiving-side transceiver 20 and making it into an analog signal by the D/A conversion circuit which is not illustrated, it amplifies with amplifier and music is generated from a loudspeaker. In this example, a music signal separate to two or more receivers can be sent to coincidence for Time-Division-Multiplexing transmission.

[0008]

[Problem(s) to be Solved by the Invention] Since it was constituted as mentioned above, in order to have generated the music which drives and wishes for the sound source which is in a terminal in a music accepting station, conventional digital music signal-transmission equipment needed to send the control signal of dedication from the off-talk pin center, large, and had the trouble that the audio equipment which the general user has could not be connected and favorite music could not be passed.

[0009] Moreover, since the transmission means was made into the optical method in Time-Division-Multiplexing light space digital signal transmission equipment, when there was constraint that a transmitting-side transceiver and a receiving-side transceiver must be installed in the location which a prospect hears directly and an obstruction was among both transceivers, or when a receiving-side transceiver was installed in another room, light could not be transmitted, but there was a trouble that music could not be enjoyed.

[0010] This invention is that by which it was made for canceling the above troubles. A compact disc player (henceforth a CD player), a digital audio tape recorder Connectable with the general digital audio device or general ISDN circuit which uses a digital music signal (It is hereafter called DAT) etc. -- It aims at obtaining the digital cordless telephone machine which can enjoy music, being able to install a receiving side freely, and being able to enjoy the music of high quality, and moving, even if it is another room and the outdoors, if it is the less than range which an electric wave reaches from a transmitting side, for example, 100-200m.

[0011]

[Means for Solving the Problem] The digital cordless telephone machine concerning this invention With the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, A main phone or a cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, With the digital music signal output part which outputs the digital music signal by this 2nd time division multiple processing section to external audio equipment the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- a cordless handset or a main phone -- having -- between a main phone and cordless handsets or two or more cordless handsets -- a digital music signal is transmitted in between.

[0012] With moreover, the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into

the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, A main phone or a cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, The digital-to-analog section which changes the digital music signal by this 2nd time division multiple processing section into an analog music signal, The voice generating section which outputs the analog music signal by this digital-to-analog section as voice, the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- said cordless handset or said main phone -- having -- between said main phones and said cordless handsets or two or more cordless handsets -- a digital music signal is transmitted in between and voice is outputted.

[0013] moreover, the above -- an earphone connection is prepared between the above-mentioned digital-to-analog section and the above-mentioned voice generating section, and an earphone is used for a cordless handset or a main phone as the above-mentioned voice generating section.

[0014] furthermore, the above -- a cordless handset or the above-mentioned main phone is equipped with the receiver section, the switch section which changes the output of the digital music signal by the time division multiple processing section of the above 2nd to said receiver section or the digital music signal output part of the above 2nd, and the control unit which operates this switch section.

[0015] moreover, the above -- a cordless handset or a main phone is equipped with the receiver section, the switch section which changes the output of the digital music signal by the time division multiple processing section of the above 2nd to said receiver section or the above-mentioned voice generating section, and the control unit which operates this switch section.

[0016]

[Function] The digital cordless telephone machine in this invention With a main phone or a cordless handset, the 1st digital music signal input part, the 1st time division multiple processing section, and the modulation section perform predetermined signal processing for audio equipment or the digital music signal from an ISDN circuit. With the cordless handset or main phone which transmitted to the cordless handset or the main phone as a radio signal from the 1st antenna, and was received with the 2nd antenna, this radio signal The recovery section, A music signal with little [it is strong in an outpatient department noise, and] voice degradation by attenuation of a signal is transmitted by the 2nd time division multiple processing section's performing predetermined signal processing, and outputting digital music to external audio equipment from the 2nd digital music signal-processing section.

[0017] Clear music is outputted in the location distant from the audio equipment or the ISDN circuit of the source of music by changing the music signal from the 2nd time division multiple processing section of a cordless handset or a main phone into an analog music signal by the digital-to-analog section, and outputting from the voice generating section. Furthermore, clear comfort is heard from an earphone by preparing an earphone connection in a cordless handset or a main phone, and using an earphone.

Moreover, the output path of a music signal is chosen by operating the switch section by the control unit and outputting a digital music signal to the receiver section or the 2nd digital music signal output part. Furthermore, the output path of a music signal is chosen by operating the switch section by the control unit and outputting a digital music signal to the receiver section or the voice generating section.

[0018]

[Example]

Example 1. drawing 1 is the block diagram of the digital cordless telephone machine in which one example of this invention is shown. In drawing, 24 is a main phone linked to a public line, and the ISDN interface circuitry which in 25 a connection with an ISDN circuit and 26 take a connection with an analog network, and 27 takes the synchronization with an ISDN circuit, and outputs and inputs data, the codec to which 28 performs conversion of an analog sound signal and a digital signal, and 29 are the

digital music signal input parts from a digital audio device (after-mentioned).

[0019] In order to change into a predetermined burst signal required for a carrying-out-radio transmission of these digital signals sake the digital music signal interface circuitry to which 30 carries out synchronous doubling with an internal clock, and 31, they are a time division multiple processing circuit (henceforth a TDMA circuit) which performs time-division multiplexing. CPU which controls the channel setup of the Radio Communications Department 33 (henceforth the RF section) to which 32 performs the strange recovery of the TDMA circuit 31, a burst signal, and a radio signal etc., and 34 are antennas which transmit and receive a radio signal. 35 is a digital audio device which has the digital music signal output parts 36, such as a CD player and DAT.

[0020] 37 is a cordless handset, it is used for the usual message, has the receiver 38 which shows an earphone, a microphone 39, the digital music signal interface circuitry 40 which outputs the received digital music signal, and its digital music signal output part 41, and, otherwise, has a codec 42, the time division multiple processing circuit 43 (henceforth a TDMA circuit), CPU44, the Radio Communications Department 45 (henceforth the RF section), and an antenna 46 like a main phone 24. 47 is audio amplifier equipment, it has the digital music signal input part 48, and has the digital to analog circuit 49 (henceforth a D/A conversion circuit), and an amplifying circuit 50 inside, and a loudspeaker 51 is connected outside. As long as this audio amplifier equipment 47 and loudspeaker 51 build in each above-mentioned circuit, they may use a commercial item.

[0021] In addition, the double line during a ***** block, single track, and an arrow head show the I/O path of an analog signal, a digital signal, and a control signal, respectively. moreover, the TDMA circuit 31 -- the 1st time division multiple processing section and the RF section 33 -- the modulation section and an antenna 34 -- in the 1st antenna and CPU32, the recovery section and the TDMA circuit 43 show the 2nd time division multiple processing section, and, as for the 1st control section and an antenna 46, CPU44 shows the 2nd control section, as for the 2nd antenna and the RF section 45.

[0022] Next, actuation is explained. The digital music signal outputted from the digital music signal output part 36 of the digital audio device 35 is inputted into the digital music signal input part 29 of a main phone 24, is once accumulated by the digital music signal interface circuitry 29, doubles a synchronization, and is serially transmitted to the TDMA circuit 31. A speed conversion is carried out to a predetermined rate here for a radio transmission, and it is fabricated by the form of a time-sharing burst signal, is sent to the RF section 33, becomes irregular here, and is transmitted to a cordless handset 37 by the wireless electric wave from an antenna 34.

[0023] Next, in a cordless handset 37, an antenna 46 receives this wireless electric wave, it gets over to a digital signal in the RF section 45, the music signal by which time sharing is carried out in the TDMA circuit 43 is returned to a continuous ringing, and it changes into the digital music signal interface circuitry 40 at the form of delivery and an original digital music signal. And it outputs from the digital music signal output part 41, is outputted to the connected audio amplifier 47 with the digital music signal input part 48, and is changed into an analog signal for the first time by the D/A conversion circuit 49 of the interior, and after amplifying in an amplifying circuit 50, music is generated from a loudspeaker 51. In addition, CPUs 32 and 44 control the TDMA circuits 31 and 43, respectively, and define the assignment to the time amount slot of a burst signal. Moreover, control of the RF sections 33 and 45 is also performed and setup of a radio channel and detection of phasing are performed.

[0024] Next, detailed actuation of the digital music signal interface circuitry 30 is explained. although the rate of the digital signal of CD and DAT is as high-speed as number - about tenMbps(es), the signal rates which can be transmitted with a digital cordless telephone machine are 32Kbps(es) per one slot. Therefore, it is necessary to change a signal rate within the digital music signal interface circuitry 30. For example, the signal inputted from the digital music signal input part 29 compresses the amount of data by taking difference, or reduces the transmission amount of data by thinning out a sampling in the range which a sample frequency is dropped [range] on a sample rate frequency converter (fs converter), and does not degrade tone quality etc. This processing is performed within the digital music signal interface circuitry 30, and it is sent to the TDMA circuit 31 as a digital signal of 32Kbps.

[0025] There is discernment of a right-and-left channel as still more characteristic actuation. The music

signal from the digital audio device 35 is a stereo signal, and the data of two right and left are inputted as serial data by turns. Therefore, unless it knows where [where / from / to] is to where by the signal of a left channel at the following right channel as for a signal, exact stereo music is unreproducible. Since the recognition signal of this right-and-left channel is given from audio equipment synchronizing with a music signal, in the digital music signal interface circuitry 30, this is detected, and it gives a recognition signal to the compressed music signal, and transmits it to the TDMA circuit 31.

[0026] This recognition signal can consider how to insert an identifier bit at the head of the signal of the left or a right channel as control information apart from a music signal into delivery, the method of inserting into a control information bit for every burst, and transmitting the wireless section, and a music signal. In the digital music signal interface circuitry 40 of a cordless handset 37 which receives, the signal of a right-and-left channel is detected based on this identifier, and it dissociates, respectively, reproduces in an original form, and outputs from the digital music signal output part 41 as a digital music signal.

[0027] Since it can transmit to the audio amplifier equipment 20 which connected the music signal from the digital audio device 35 to the cordless handset 37 as mentioned above with the digital signal and there is no degradation of tone quality, such as mixing of a noise, the middle, clear music can be listened to. In addition, as a sound source, speech synthesis IC etc. is not specially built in a digital cordless telephone machine, and a CD player, DAT, etc. assume the digital audio device usually marketed. Moreover, the transmission system by the millimeter wave band it becomes a frequency is more high and expensive also by the same electromagnetic wave furnishing, or the light from which a transmission property completely differs is excepted supposing transmission between a base phone 24 and a cordless handset 37 using 1-3000MHz HF and VF which are wide opened a radio signal especially small power radio equipment, and for wireless LAN, and a UHF band radio frequency.

[0028] Although the example 1 explained the case which is example 2. where the direct digital audio device 35 was connected to a main phone 24, in the configuration of drawing 1, the voice output of the digital music signal transmitted via an ISDN circuit may be carried out from the loudspeaker 51 linked to a cordless handset 37. In this case, the digital music signal inputted from the ISDN circuit connection 25 doubles timing by the interface circuitry 27, is inputted into the TDMA circuit 31, is transmitted to a cordless handset 37 in the same procedure as an example 1 henceforth, and carries out a voice output from a loudspeaker 51.

[0029] Thus, if constituted, even if it will not prepare the sound source and control section of dedication like the off talk music terminal stated with the conventional technique, direct sound comfort can be transmitted through a circuit. Moreover, sending a music signal to the external loudspeaker 51 through the digital music signal interface circuitry 40 as mentioned above, and sounding music, since the wireless section between an ISDN circuit and main phone 24 cordless handset 37 can also transmit the signal of a segment to coincidence twice by multiplexing, it dissociates in the TDMA circuit 43 and a sound signal is outputted to a codec 42, it carries out analogue conversion, can drive a receiver 39 and can be generated.

[0030] On the other hand, the voice from a microphone 39 is changed into a digital signal by the codec 42, is sent to the TDMA circuit 43, follows a path contrary to the music signal mentioned above, and is sent out from the ISDN circuit connection 25 to an ISDN circuit. Thus, by multiplexing and transmitting synchronously, it can talk over the telephone, listening to music, or voice service can be received.

[0031] Although the example 3. above-mentioned examples 1 and 2 showed what formed the digital music signal output part 41 to the cordless handset 37, if D/A converter 49, an amplifying circuit 50, and a loudspeaker 51 are built in the child inside of a plane, it can move freely by the ability excelling in portability, and the possible cordless handset of music generating can be obtained. The block diagram inside this field hybrid opportunity is shown in drawing 2. About actuation, signal processing of the radio signal which received with the antenna 46 like the above-mentioned examples 1 and 2 is carried out in the RF section 45, the TDMA circuit 43, the D/A conversion circuit 49, and an amplifying circuit 50, and voice is generated from a loudspeaker 51.

[0032] Although the example 4. above-mentioned example 3 showed what built in the loudspeaker 51, if

an earphone jack is prepared instead of building in a loudspeaker 51, music can be enjoyed only by itself, without not spoiling portability or migratory and making a surrounding man trouble. The block diagram of this cordless handset is shown in drawing 3. For 52, in drawing, an earphone jack and 53 are [an earphone and 54] interconnection cables. About actuation, the digital music signal outputted from the amplifying circuit 50 attaches the earphone jack 52 and an interconnection cable 54, and a voice output is carried out from an earphone 53.

[0033] Although the example 5. above-mentioned example 3 showed what generates music from a loudspeaker 51, with a circuit changing switch, music may be passed not only to the loudspeaker 51 but to the receiver 38, a surrounding man does not have mind, and music can be enjoyed. The block diagram of this cordless handset is shown in drawing 4. In drawing, 55 is a control unit which directs whether generate music from a loudspeaker 51 or a receiver 38, and consists of a carbon button etc. 56 is a switching circuit which it is prepared between an amplifying circuit 50 and a loudspeaker 51, and is turned on and off with the directions from a control unit 55. 57 is a switching circuit which is prepared between a codec 42 and a receiver 38 and is turned on and off with the directions from a control unit 55. [0034] About actuation, a control unit 55 is operated and ON or OFF of switching circuits 56 and 57 is directed to CPU44. For example, when generating voice from a loudspeaker 51, a switching circuit 56 is turned on and a switching circuit 57 is turned off. Moreover, when generating voice from a receiver 38, a switching circuit 56 is turned off and a switching circuit 57 is turned on. In addition, establish these switching circuits 56 and 57 in the circuit in the TDMA circuit 43, it is made to suspend a signal output, and music signal sending out in a loudspeaker 51 may be controlled like the above.

[0035] In addition, although what transmits the digital music signal from the digital audio device 35 to a cordless handset 37 from a main phone 24, and generates voice about the above-mentioned examples 1-5 was shown, a digitized voice signal may be transmitted to the main phone from a cordless handset, or a cordless handset from a cordless handset, and music may be generated. For example, the digital audio device 35 and the digital music signal input part 29 are established in the cordless handset of a transmitting agency, a digital music signal is inputted into a digital music signal interface circuitry, a digital music signal interface circuitry and the digital music signal output part 41 are established in the main phone or cordless handset of a transmission place, the D/A conversion circuit 49, an amplifying circuit 50, and a loudspeaker 51 are installed, and music is generated from a loudspeaker 51. Moreover, it installs in a transmission place like [grades / an earphone 53, a switching circuit 56, and / 57] examples 4 and 5.

[0036]

[Effect of the Invention] As mentioned above, according to this invention, a digital music signal is inputted into a main phone or a cordless handset from a digital audio device or an ISDN circuit. Since a radio transmission is carried out to a cordless handset or a main phone by various signal processing and it was made to output the digital music signal to external audio equipment A sound signal with little tone-quality degradation can be transmitted, if it is the location which can receive the radio signal from a main phone or a cordless handset, a cordless handset or a main phone can be installed freely, and it is effective in the ability to appreciate the music of the quality of loud sound from the connected audio equipment.

[0037] Moreover, since a cordless handset or a main phone receives a radio signal, the digital music signal sent out from the 2nd time division multiple processing section is changed into an analog music signal by the digital-to-analog section and it was made to output voice from the voice generating section, if it is within the limits which can receive a radio signal, a cordless handset or a main phone can be installed freely, and there is effectiveness which can appreciate the music of high quality from the voice generating section.

[0038] Furthermore, since a cordless handset or a main phone earphone connection is prepared, an earphone is connected and it was made to output voice, if it is within the limits which can appreciate the music of the quality of loud sound from an earphone, and can receive a radio signal about a cordless handset, an earphone can be heard carrying a cordless handset and it is effective in the ability to give portability.

[0039] Moreover, since the switch section is operated by the control unit and it was made to output a digital music signal to the receiver section of a digital music signal, or the 2nd digital music signal output part with a cordless handset or a main phone, while the musical output section can be chosen according to an application and convenience improves, when the receiver section is chosen, the effectiveness that it can be heard without leaking music is in a perimeter.

[0040] Moreover, with a cordless handset or a main phone, operate the switch section by the control unit, and since it was made to output a digital music signal to the receiver section or the voice generating section, the output of a digital music signal While the musical output section can be chosen according to an application and convenience improves, when it can be heard without leaking music to a perimeter when the receiver section is chosen and the voice generating section is chosen, it is effective in the ability to output clear music to a perimeter.

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TECHNICAL FIELD

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PRIOR ART

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[0003] Moreover, drawing 6 is the block diagram of the conventional Time-Division-Multiplexing light space digital signal transmission equipment shown in JP,3-154446,A. In drawing, 13 is sources of a digital signal, such as audio equipment, 14 is a transmitting-side transceiver, and it consists of the time-division multiplexing circuit 15, a digital signal modulation circuit 16, an electric-light conversion drive circuit 17 that changes an electrical signal into a lightwave signal, and a light-emitting part 18. The electric eye to which 19 receives a lightwave signal, and 20 are receiving-side transceivers, and consist of an optical-electrical-and-electric-equipment conversion circuit 21, a digital signal demodulator circuit 22, and a Time-Division-Multiplexing separation circuit 23.

[0004] First, actuation of a music signal terminal is explained using drawing 5. In the off talk music terminal 3, when the message by telephone 7 is not performed, the analog signal which modulated digital computer information by one-way traffic through the telephone line 2 from the off talk pin center, large (not shown) is sent. Then, the off talk music terminal 3 turns off a switching circuit 5, receives the analog signal from an off talk pin center, large, and changes it into an original digital signal with an internal modem (not shown).

[0005] Internal CPU (not shown) supervises the signal, and if it identifies that it is the information from an off talk pin center, large, it will download in internal memory (not shown). And a sound source is controlled based on the information, music is generated, FM radio signal is modulated in the FM modulation circuit 4, and it is transmitted to reception / playback block 8 from an antenna 6. In reception / playback block 8, an antenna 12 receives the FM radio signal, and it gets over in the FM receiving circuit 9, it amplifies with amplifier 10, and music is generated from a loudspeaker 11.

[0006] Next, actuation of Time-Division-Multiplexing light space digital signal transmission equipment is explained using drawing 6. In the above-mentioned conventional example, although the radio signal carried out FM modulation of the analog music signal, the radio transmission of this example is carried out using light with a digital signal. Electric - light conversion is carried out in electric-light conversion drive circuit 21, and the music signal generated from the source 13 of a digital signal is sent out to space as a lightwave signal from a photogenic organ 18, after time-division multiplexing is carried out in conformity with a fixed format in the time-division multiplexing circuit 15 in the transmitting-side transceiver 14 and a signal format required for transmission becomes irregular in the digital signal modulation circuit 16.

[0007] In the receiving-side transceiver 20, after receiving the lightwave signal by the electric eye 19 and changing a lightwave signal into an electrical signal by optical - electrical-and-electric-equipment

conversion circuit 21, a required thing is separated and taken [from] out among the signals by which got over in the digital signal demodulator circuit 22, and time-division multiplexing was carried out in the Time-Division-Multiplexing separation circuit 23. After outputting this from the receiving-side transceiver 20 and making it into an analog signal by the D/A conversion circuit which is not illustrated, it amplifies with amplifier and music is generated from a loudspeaker. In this example, a music signal separate to two or more receivers can be sent to coincidence for Time-Division-Multiplexing transmission.

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, according to this invention, a digital music signal is inputted into a main phone or a cordless handset from a digital audio device or an ISDN circuit. Since a radio transmission is carried out to a cordless handset or a main phone by various signal processing and it was made to output the digital music signal to external audio equipment A sound signal with little tone-quality degradation can be transmitted, if it is the location which can receive the radio signal from a main phone or a cordless handset, a cordless handset or a main phone can be installed freely, and it is effective in the ability to appreciate the music of the quality of loud sound from the connected audio equipment.

[0037] Moreover, since a cordless handset or a main phone receives a radio signal, the digital music signal sent out from the 2nd time division multiple processing section is changed into an analog music signal by the digital-to-analog section and it was made to output voice from the voice generating section, if it is within the limits which can receive a radio signal, a cordless handset or a main phone can be installed freely, and there is effectiveness which can appreciate the music of high quality from the voice generating section.

[0038] Furthermore, since a cordless handset or a main phone earphone connection is prepared, an earphone is connected and it was made to output voice, if it is within the limits which can appreciate the music of the quality of loud sound from an earphone, and can receive a radio signal about a cordless handset, an earphone can be heard carrying a cordless handset and it is effective in the ability to give portability.

[0039] Moreover, since the switch section is operated by the control unit and it was made to output a digital music signal to the receiver section of a digital music signal, or the 2nd digital music signal output part with a cordless handset or a main phone, while the musical output section can be chosen according to an application and convenience improves, when the receiver section is chosen, the effectiveness that it can be heard without leaking music is in a perimeter.

[0040] Moreover, with a cordless handset or a main phone, operate the switch section by the control unit, and since it was made to output a digital music signal to the receiver section or the voice generating section, the output of a digital music signal While the musical output section can be chosen according to an application and convenience improves, when it can be heard without leaking music to a perimeter when the receiver section is chosen and the voice generating section is chosen, it is effective in the ability to output clear music to a perimeter.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Since it was constituted as mentioned above, in order to have generated the music which drives and wishes for the sound source which is in a terminal in a music accepting station, conventional digital music signal-transmission equipment needed to send the control signal of dedication from the off-talk pin center, large, and had the trouble that the audio equipment which the general user has could not be connected and favorite music could not be passed.

[0009] Moreover, since the transmission means was made into the optical method in Time-Division-Multiplexing light space digital signal transmission equipment, when there was constraint that a transmitting-side transceiver and a receiving-side transceiver must be installed in the location which a prospect hears directly and an obstruction was among both transceivers, or when a receiving-side transceiver was installed in another room, light could not be transmitted, but there was a trouble that music could not be enjoyed.

[0010] This invention is that by which it was made for canceling the above troubles. A compact disc player (henceforth a CD player), a digital audio tape recorder Connectable with the general digital audio device or general ISDN circuit which uses a digital music signal (It is hereafter called DAT) etc. -- It aims at obtaining the digital cordless telephone machine which can enjoy music, being able to install a receiving side freely, and being able to enjoy the music of high quality, and moving, even if it is another room and the outdoors, if it is the less than range which an electric wave reaches from a transmitting side, for example, 100-200m.

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MEANS

[Means for Solving the Problem] The digital cordless telephone machine concerning this invention With the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, A main phone or a cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, With the digital music signal output part which outputs the digital music signal by this 2nd time division multiple processing section to external audio equipment the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- a cordless handset or a main phone -- having -- between a main phone and cordless handsets or two or more cordless handsets -- a digital music signal is transmitted in between.

[0012] With moreover, the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, A main phone or a cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, The digital-to-analog section which changes the digital music signal by this 2nd time division multiple processing section into an analog music signal, The voice generating section which outputs the analog music signal by this digital-to-analog section as voice, the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- said cordless handset or said main phone -- having -- between said main phones and said cordless handsets or two or more cordless handsets -- a digital music signal is transmitted in between and voice is outputted.

[0013] moreover, the above -- an earphone connection is prepared between the above-mentioned digital-to-analog section and the above-mentioned voice generating section, and an earphone is used for a cordless handset or a main phone as the above-mentioned voice generating section.

[0014] furthermore, the above -- a cordless handset or the above-mentioned main phone is equipped with the receiver section, the switch section which changes the output of the digital music signal by the

time division multiple processing section of the above 2nd to said receiver section or the digital music signal output part of the above 2nd, and the control unit which operates this switch section.

[0015] moreover, the above -- a cordless handset or a main phone is equipped with the receiver section, the switch section which changes the output of the digital music signal by the time division multiple processing section of the above 2nd to said receiver section or the above-mentioned voice generating section, and the control unit which operates this switch section.

[Translation done.]

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OPERATION

[Function] The digital cordless telephone machine in this invention With a main phone or a cordless handset, the 1st digital music signal input part, the 1st time division multiple processing section, and the modulation section perform predetermined signal processing for audio equipment or the digital music signal from an ISDN circuit. With the cordless handset or main phone which transmitted to the cordless handset or the main phone as a radio signal from the 1st antenna, and was received with the 2nd antenna, this radio signal The recovery section, A music signal with little [it is strong in an outpatient department noise, and] voice degradation by attenuation of a signal is transmitted by the 2nd time division multiple processing section's performing predetermined signal processing, and outputting digital music to external audio equipment from the 2nd digital music signal-processing section.

[0017] Clear music is outputted in the location distant from the audio equipment or the ISDN circuit of the source of music by changing the music signal from the 2nd time division multiple processing section of a cordless handset or a main phone into an analog music signal by the digital-to-analog section, and outputting from the voice generating section. Furthermore, clear comfort is heard from an earphone by preparing an earphone connection in a cordless handset or a main phone, and using an earphone. Moreover, the output path of a music signal is chosen by operating the switch section by the control unit and outputting a digital music signal to the receiver section or the 2nd digital music signal output part. Furthermore, the output path of a music signal is chosen by operating the switch section by the control unit and outputting a digital music signal to the receiver section or the voice generating section.

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EXAMPLE

[Example]

Example 1. drawing 1 is the block diagram of the digital cordless telephone machine in which one example of this invention is shown. In drawing, 24 is a main phone linked to a public line, and the ISDN interface circuitry which in 25 a connection with an ISDN circuit and 26 take a connection with an analog network, and 27 takes the synchronization with an ISDN circuit, and outputs and inputs data, the codec to which 28 performs conversion of an analog sound signal and a digital signal, and 29 are the digital music signal input parts from a digital audio device (after-mentioned).

[0019] In order to change into a predetermined burst signal required for a carrying-out-radio transmission of these digital signals sake the digital music signal interface circuitry to which 30 carries out synchronous doubling with an internal clock, and 31, they are a time division multiple processing circuit (henceforth a TDMA circuit) which performs time-division multiplexing. CPU which controls the channel setup of the Radio Communications Department 33 (henceforth the RF section) to which 32 performs the strange recovery of the TDMA circuit 31, a burst signal, and a radio signal etc., and 34 are antennas which transmit and receive a radio signal. 35 is a digital audio device which has the digital music signal output parts 36, such as a CD player and DAT.

[0020] 37 is a cordless handset, it is used for the usual message, has the receiver 38 which shows an earphone, a microphone 39, the digital music signal interface circuitry 40 which outputs the received digital music signal, and its digital music signal output part 41, and, otherwise, has a codec 42, the time division multiple processing circuit 43 (henceforth a TDMA circuit), CPU44, the Radio Communications Department 45 (henceforth the RF section), and an antenna 46 like a main phone 24. 47 is audio amplifier equipment, it has the digital music signal input part 48, and has the digital to analog circuit 49 (henceforth a D/A conversion circuit), and an amplifying circuit 50 inside, and a loudspeaker 51 is connected outside. As long as this audio amplifier equipment 47 and loudspeaker 51 build in each above-mentioned circuit, they may use a commercial item.

[0021] In addition, the double line during a ***** block, single track, and an arrow head show the I/O path of an analog signal, a digital signal, and a control signal, respectively. moreover, the TDMA circuit 31 -- the 1st time division multiple processing section and the RF section 33 -- the modulation section and an antenna 34 -- in the 1st antenna and CPU32, the recovery section and the TDMA circuit 43 show the 2nd time division multiple processing section, and, as for the 1st control section and an antenna 46, CPU44 shows the 2nd control section, as for the 2nd antenna and the RF section 45.

[0022] Next, actuation is explained. The digital music signal outputted from the digital music signal output part 36 of the digital audio device 35 is inputted into the digital music signal input part 29 of a main phone 24, is once accumulated by the digital music signal interface circuitry 29, doubles a synchronization, and is serially transmitted to the TDMA circuit 31. A speed conversion is carried out to a predetermined rate here for a radio transmission, and it is fabricated by the form of a time-sharing burst signal, is sent to the RF section 33, becomes irregular here, and is transmitted to a cordless handset 37 by the wireless electric wave from an antenna 34.

[0023] Next, in a cordless handset 37, an antenna 46 receives this wireless electric wave, it gets over to a

digital signal in the RF section 45, the music signal by which time sharing is carried out in the TDMA circuit 43 is returned to a continuous ringing, and it changes into the digital music signal interface circuitry 40 at the form of delivery and an original digital music signal. And it outputs from the digital music signal output part 41, is outputted to the connected audio amplifier 47 with the digital music signal input part 48, and is changed into an analog signal for the first time by the D/A conversion circuit 49 of the interior, and after amplifying in an amplifying circuit 50, music is generated from a loudspeaker 51. In addition, CPUs 32 and 44 control the TDMA circuits 31 and 43, respectively, and define the assignment to the time amount slot of a burst signal. Moreover, control of the RF sections 33 and 45 is also performed and setup of a radio channel and detection of phasing are performed.

[0024] Next, detailed actuation of the digital music signal interface circuitry 30 is explained. although the rate of the digital signal of CD and DAT is as high-speed as number - about tenMbps(es), the signal rates which can be transmitted with a digital cordless telephone machine are 32Kbps(es) per one slot. Therefore, it is necessary to change a signal rate within the digital music signal interface circuitry 30. For example, the signal inputted from the digital music signal input part 29 compresses the amount of data by taking difference, or reduces the transmission amount of data by thinning out a sampling in the range which a sample frequency is dropped [range] on a sample rate frequency converter (fs converter), and does not degrade tone quality etc. This processing is performed within the digital music signal interface circuitry 30, and it is sent to the TDMA circuit 31 as a digital signal of 32Kbps.

[0025] There is discernment of a right-and-left channel as still more characteristic actuation. The music signal from the digital audio device 35 is a stereo signal, and the data of two right and left are inputted as serial data by turns. Therefore, unless it knows where [where / from / to] is to where by the signal of a left channel at the following right channel as for a signal, exact stereo music is unreproducible. Since the recognition signal of this right-and-left channel is given from audio equipment synchronizing with a music signal, in the digital music signal interface circuitry 30, this is detected, and it gives a recognition signal to the compressed music signal, and transmits it to the TDMA circuit 31.

[0026] This recognition signal can consider how to insert an identifier bit at the head of the signal of the left or a right channel as control information apart from a music signal into delivery, the method of inserting into a control information bit for every burst, and transmitting the wireless section, and a music signal. In the digital music signal interface circuitry 40 of a cordless handset 37 which receives, the signal of a right-and-left channel is detected based on this identifier, and it dissociates, respectively, reproduces in an original form, and outputs from the digital music signal output part 41 as a digital music signal.

[0027] Since it can transmit to the audio amplifier equipment 20 which connected the music signal from the digital audio device 35 to the cordless handset 37 as mentioned above with the digital signal and there is no degradation of tone quality, such as mixing of a noise, the middle, clear music can be listened to. In addition, as a sound source, speech synthesis IC etc. is not specially built in a digital cordless telephone machine, and a CD player, DAT, etc. assume the digital audio device usually marketed. Moreover, the transmission system by the millimeter wave band it becomes a frequency is more high and expensive also by the same electromagnetic wave furnishing, or the light from which a transmission property completely differs is excepted supposing transmission between a base phone 24 and a cordless handset 37 using 1-3000MHz HF and VF which are wide opened a radio signal especially small power radio equipment, and for wireless LAN, and a UHF band radio frequency.

[0028] Although the example 1 explained the case which is example 2. where the direct digital audio device 35 was connected to a main phone 24, in the configuration of drawing 1, the voice output of the digital music signal transmitted via an ISDN circuit may be carried out from the loudspeaker 51 linked to a cordless handset 37. In this case, the digital music signal inputted from the ISDN circuit connection 25 doubles timing by the interface circuitry 27, is inputted into the TDMA circuit 31, is transmitted to a cordless handset 37 in the same procedure as an example 1 henceforth, and carries out a voice output from a loudspeaker 51.

[0029] Thus, if constituted, even if it will not prepare the sound source and control section of dedication like the off talk music terminal stated with the conventional technique, direct sound comfort can be

transmitted through a circuit. Moreover, sending a music signal to the external loudspeaker 51 through the digital music signal interface circuitry 40 as mentioned above, and sounding music, since the wireless section between an ISDN circuit and main phone 24 cordless handset 37 can also transmit the signal of a segment to coincidence twice by multiplexing, it dissociates in the TDMA circuit 43 and a sound signal is outputted to a codec 42, it carries out analogue conversion, can drive a receiver 39 and can be generated.

[0030] On the other hand, the voice from a microphone 39 is changed into a digital signal by the codec 42, is sent to the TDMA circuit 43, follows a path contrary to the music signal mentioned above, and is sent out from the ISDN circuit connection 25 to an ISDN circuit. Thus, by multiplexing and transmitting synchronously, it can talk over the telephone, listening to music, or voice service can be received.

[0031] Although the example 3. above-mentioned examples 1 and 2 showed what formed the digital music signal output part 41 to the cordless handset 37, if D/A converter 49, an amplifying circuit 50, and a loudspeaker 51 are built in the child inside of a plane, it can move freely by the ability excelling in portability, and the possible cordless handset of music generating can be obtained. The block diagram inside this field hybrid opportunity is shown in drawing 2. About actuation, signal processing of the radio signal which received with the antenna 46 like the above-mentioned examples 1 and 2 is carried out in the RF section 45, the TDMA circuit 43, the D/A conversion circuit 49, and an amplifying circuit 50, and voice is generated from a loudspeaker 51.

[0032] Although the example 4. above-mentioned example 3 showed what built in the loudspeaker 51, if an earphone jack is prepared instead of building in a loudspeaker 51, music can be enjoyed only by itself, without not spoiling portability or migratory and making a surrounding man trouble. The block diagram of this cordless handset is shown in drawing 3. For 52, in drawing, an earphone jack and 53 are [an earphone and 54] interconnection cables. About actuation, the digital music signal outputted from the amplifying circuit 50 attaches the earphone jack 52 and an interconnection cable 54, and a voice output is carried out from an earphone 53.

[0033] Although the example 5. above-mentioned example 3 showed what generates music from a loudspeaker 51, with a circuit changing switch, music may be passed not only to the loudspeaker 51 but to the receiver 38, a surrounding man does not have mind, and music can be enjoyed. The block diagram of this cordless handset is shown in drawing 4. In drawing, 55 is a control unit which directs whether generate music from a loudspeaker 51 or a receiver 38, and consists of a carbon button etc. 56 is a switching circuit which it is prepared between an amplifying circuit 50 and a loudspeaker 51, and is turned on and off with the directions from a control unit 55. 57 is a switching circuit which is prepared between a codec 42 and a receiver 38 and is turned on and off with the directions from a control unit 55.

[0034] About actuation, a control unit 55 is operated and ON or OFF of switching circuits 56 and 57 is directed to CPU44. For example, when generating voice from a loudspeaker 51, a switching circuit 56 is turned on and a switching circuit 57 is turned off. Moreover, when generating voice from a receiver 38, a switching circuit 56 is turned off and a switching circuit 57 is turned on. In addition, establish these switching circuits 56 and 57 in the circuit in the TDMA circuit 43, it is made to suspend a signal output, and music signal sending out in a loudspeaker 51 may be controlled like the above.

[0035] In addition, although what transmits the digital music signal from the digital audio device 35 to a cordless handset 37 from a main phone 24, and generates voice about the above-mentioned examples 1-5 was shown, a digitized voice signal may be transmitted to the main phone from a cordless handset, or a cordless handset from a cordless handset, and music may be generated. For example, the digital audio device 35 and the digital music signal input part 29 are established in the cordless handset of a transmitting agency, a digital music signal is inputted into a digital music signal interface circuitry, a digital music signal interface circuitry and the digital music signal output part 41 are established in the main phone or cordless handset of a transmission place, the D/A conversion circuit 49, an amplifying circuit 50, and a loudspeaker 51 are installed, and music is generated from a loudspeaker 51. Moreover, it installs in a transmission place like [grades / an earphone 53, a switching circuit 56, and / 57] examples 4 and 5.

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] In the digital cordless telephone machine which has the main phone and at least one or more cordless handsets which were connected through the wireless circuit With the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, Said main phone or said cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, With the digital music signal output part which outputs the digital music signal by this 2nd time division multiple processing section to external audio equipment the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- said cordless handset or said main phone -- having -- between said main phones and said cordless handsets or two or more cordless handsets -- the digital cordless telephone machine characterized by transmitting a digital music signal in between.

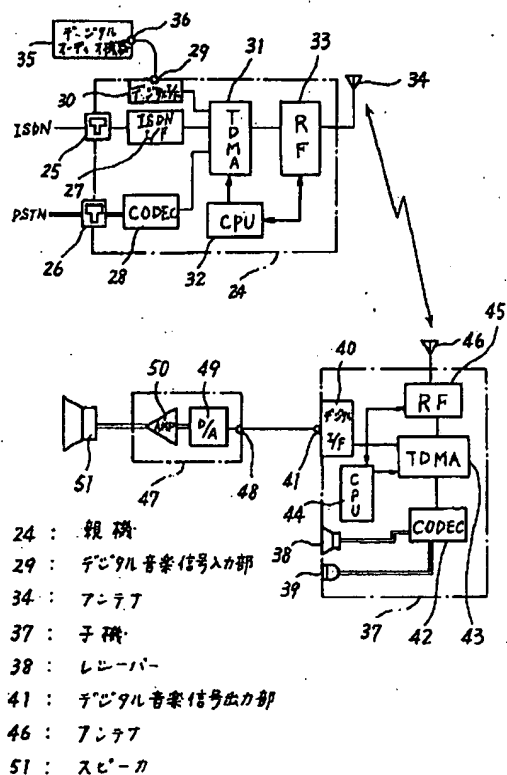

[Claim 2] In the digital cordless telephone machine which has the main phone and at least one or more cordless handsets which were connected through the wireless circuit With the digital music signal input part by which audio equipment or the digital music signal from an ISDN circuit is inputted The 1st time division multiple processing section which carries out time sharing of the digital music signal from this digital music signal input part, and is changed into the burst signal of a fixed form, The modulation section which modulates the burst signal by this 1st time division multiple processing section to a radio signal, Said main phone or said cordless handset is equipped with the 1st antenna which is connected to this modulation section and transmits a radio signal, and the 1st control section which controls said the 1st time division multiple processing section and said modulation section. The 2nd antenna which receives the radio signal transmitted from said 1st antenna, The recovery section which is connected to this 2nd antenna and restores to a radio signal to a burst signal, The 2nd time division multiple processing section which changes into the original digital music signal the burst signal to which it restored by this recovery section, The digital-to-analog section which changes the digital music signal by this 2nd time division multiple processing section into an analog music signal, The voice generating section which outputs the analog music signal by this digital-to-analog section as voice, the 2nd control section which controls said recovery section and said 2nd time division multiple processing section -- said cordless handset or said main phone -- having -- between said main phones and said cordless handsets or two or more cordless handsets -- the digital cordless telephone machine characterized by transmitting a digital music signal in between and outputting voice.

[Claim 3] the above -- the digital cordless telephone machine according to claim 2 characterized by having prepared the earphone connection between the above-mentioned digital-to-analog section and the above-mentioned voice generating section, and using an earphone for a cordless handset or the above-mentioned main phone as the above-mentioned voice generating section.

[Claim 4] the above -- the digital cordless telephone machine according to claim 1 characterized by equipping a cordless handset or the above-mentioned main phone with the receiver section, the switch section which changes the output of the digital music signal by the time division multiple processing section of the above 2nd to said receiver section or the digital music signal output part of the above 2nd, and the control unit which operates this switch section.

[Claim 5] the above -- the digital cordless telephone machine according to claim 2 characterized by equipping a cordless handset or a main phone with the receiver section, the switch section which changes the output of the digital music signal by the time division multiple processing section of the above 2nd to said receiver section or the above-mentioned voice generating section, and the control unit which operates this switch section.

[Translation done.]

Drawing selection **Representative drawing** 

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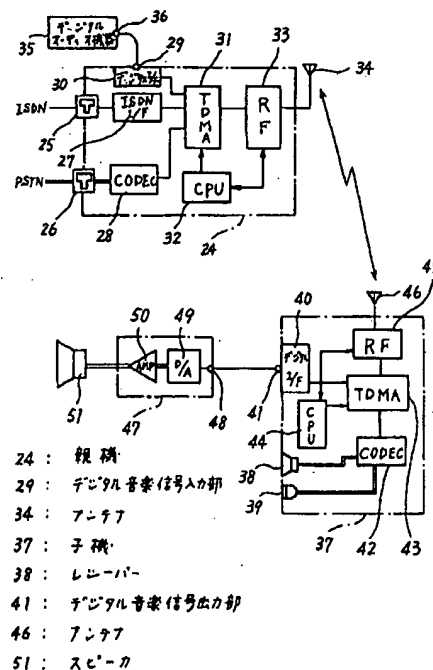
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(54) 【発明の名称】 デジタルコードレス電話機

(57) 【要約】

【目的】 デジタルオーディオ機器またはISDN回線からのデジタル音楽信号を送受信し、音源から離れた場所でも明晰な音質の音楽を出力できるデジタルコードレス電話機を得る。

【構成】 親器24においてデジタルオーディオ機器35からのデジタル音楽信号をデジタル音楽信号入力部29へ入力し、時分割多重処理回路31、無線通信部33を介し、アンテナ34から無線信号として子機37へ送信し、子機37ではアンテナ46、無線通信部33、時分割多重処理回路31を介し、デジタル音楽信号出力部41から外部へデジタル音楽信号を出力し、オーディオアンプ47を介してスピーカ51から明晰な音楽を出力する。



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【特許請求の範囲】

【請求項1】 無線回線を介して接続された親機および少なくとも1つ以上の子機とを有するデジタルコードレス電話機において、オーディオ機器またはISDN回線からのデジタル音楽信号が入力されるデジタル音楽信号入力部と、このデジタル音楽信号入力部からのデジタル音楽信号を時分割し、定型のバースト信号に変換する第1の時分割多重処理部と、この第1の時分割多重処理部によるバースト信号を無線信号に変調する変調部と、この変調部に接続され無線信号を送信する第1のアンテナと、前記第1の時分割多重処理部および前記変調部を制御する第1の制御部とを前記親機または前記子機に備え、前記第1のアンテナから送信された無線信号を受信する第2のアンテナと、この第2のアンテナに接続され、無線信号をバースト信号に復調する復調部と、この復調部により復調されたバースト信号を元のデジタル音楽信号に変換する第2の時分割多重処理部と、この第2の時分割多重処理部によるデジタル音楽信号を外部のオーディオ機器へ出力するデジタル音楽信号出力部と、前記復調部および前記第2の時分割多重処理部を制御する第2の制御部とを前記子機または前記親機に備え、前記親機と前記子機の間または複数の子機間でデジタル音楽信号を伝送することを特徴とするデジタルコードレス電話機。

【請求項2】 無線回線を介して接続された親機および少なくとも1つ以上の子機とを有するデジタルコードレス電話機において、オーディオ機器またはISDN回線からのデジタル音楽信号が入力されるデジタル音楽信号入力部と、このデジタル音楽信号入力部からのデジタル音楽信号を時分割し、定型のバースト信号に変換する第1の時分割多重処理部と、この第1の時分割多重処理部によるバースト信号を無線信号に変調する変調部と、この変調部に接続され無線信号を送信する第1のアンテナと、前記第1の時分割多重処理部および前記変調部を制御する第1の制御部とを前記親機または前記子機に備え、前記第1のアンテナから送信された無線信号を受信する第2のアンテナと、この第2のアンテナに接続され、無線信号をバースト信号に復調する復調部と、この復調部により復調されたバースト信号を元のデジタル音楽信号に変換する第2の時分割多重処理部と、この第2の時分割多重処理部によるデジタル音楽信号をアナログ音楽信号に変換するデジタル-アナログ変換部と、このデジタル-アナログ変換部によるアナログ音楽信号を音声として出力する音声発生部と、前記復調部および前記第2の時分割多重処理部を制御する第2の制御部とを前記子機または前記親機に備え、前記親機と前記子機の間または複数の子機間でデジタル音楽信号を伝送し、音声を出力することを特徴とするデジタルコードレス電話機。

【請求項3】 上記子機または上記親機に、上記デジタ

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ル-アナログ変換部と上記音声発生部との間にイヤホン接続部を設け、上記音声発生部としてイヤホンを用いたことを特徴とする請求項2記載のデジタルコードレス電話機。

【請求項4】 上記子機または上記親機に、受話部と、上記第2の時分割多重処理部によるデジタル音楽信号の出力を前記受話部または上記第2のデジタル音楽信号出力部へ切り替えるスイッチ部と、このスイッチ部を操作する操作部とを備えたことを特徴とする請求項1記載のデジタルコードレス電話機。

【請求項5】 上記子機または親機に、受話部と、上記第2の時分割多重処理部によるデジタル音楽信号の出力を前記受話部または上記音声発生部へ切り替えるスイッチ部と、このスイッチ部を操作する操作部とを備えたことを特徴とする請求項2記載のデジタルコードレス電話機。

【発明の詳細な説明】

【0001】

【産業上の利用分野】この発明は、デジタルコードレス電話機に関するものであり、特に、デジタル音楽信号の伝送機能を備えたものである。

【0002】

【従来の技術】まず、従来のデジタル音楽信号伝送装置について説明する。図5は例えば、特開平4-63395号公報に示された従来の公衆回線を利用したオフトーク音楽受信端末のブロック図である。図において、1は電話回線2に接続する電話回線端末であり、オフトーク音楽端末3、FM変調送信回路4、スイッチング回路5、アンテナ6で構成される。7は通常の通話に供する電話機である。8は受信・再生ブロックであり、FM受信回路9、アンプ10、スピーカ11、アンテナ12で構成される。

【0003】また、図6は例えば、特開平3-154446号公報に示された従来の時分割多重光空間デジタル信号伝送装置のブロック図である。図において、13はオーディオ機器等のデジタル信号源、14は送信側トランシーバであり、時分割多重化回路15、デジタル信号変調回路16、電気信号を光信号に変換する電気-光変換駆動回路17、発光部18で構成される。19は光信号を受信する受光器、20は受信側トランシーバであり、光-電気変換回路21、デジタル信号復調回路22、時分割多重分離回路23で構成される。

【0004】まず、図5を用い、音楽信号端末の動作について説明する。オフトーク音楽端末3において、電話機7による通話が行われていない時には、オフトークセンター（図示せず）から電話回線2を介して一方通行でデジタルコンピュータ情報を変調したアナログ信号が送られてくる。そこで、オフトーク音楽端末3はスイッチング回路5をオフしてオフトークセンターからのアナログ信号を受信し、内部のモデム（図示せず）で本来のデ

ジタル信号に変換する。

【0005】内部のCPU(図示せず)はその信号を監視し、オフトークセンターからの情報であることを識別すると、内部のメモリ(図示せず)にダウンロードする。そして、その情報に基づいて音源を制御して音楽を発生させ、それをFM変調回路4でFM無線信号を変調し、アンテナ6から受信・再生ブロック8へ送信する。受信・再生ブロック8ではそのFM無線信号をアンテナ12で受信し、FM受信回路9で復調し、アンプ10で増幅して、スピーカ11から音楽を発生する。

【0006】次に、図6を用い、時分割多重光空間デジタル信号伝送装置の動作について説明する。前述の従来例では、無線信号はアナログ音楽信号をFM変調したものであったが、本例はデジタル信号のまま光を用いて無線伝送するものである。デジタル信号源13から発生する音楽信号は、送信側トランシーバ14において一定の形式に則って時分割多重化回路15で時分割多重化され、デジタル信号変調回路16で伝送に必要な信号形式に変調された後、電気-光変換駆動回路21で電気-光変換され、発光器18から光信号として空間に送出する。

【0007】受信側トランシーバ20においては、受光器19でその光信号を受信し、光-電気変換回路21で光信号を電気信号に変換した後、デジタル信号復調回路22で復調し、時分割多重分離回路23で時分割多重化された信号のうちから必要なものを分離して取り出す。これを受信側トランシーバ20から出力し、図示していないD/A変換回路でアナログ信号にした後、アンプで増幅しスピーカから音楽を発生させる。本例では、時分割多重伝送のため、複数の受信機に別々の音楽信号を同時に送ることができる。

【0008】

【発明が解決しようとする課題】従来のデジタル音楽信号伝送装置は、以上のように構成されているので、音楽受信端末では端末内にある音源を駆動して希望する音楽を発生させるには、オフトークセンターから専用の制御信号を送る必要があり、一般ユーザが持っているオーディオ機器を接続して好きな音楽を流すことはできないという問題点があった。

【0009】また、時分割多重光空間デジタル信号伝送装置では、伝送手段を光方式としているため、直接、見通しがきく位置に送信側トランシーバ、受信側トランシーバを設置しなければならないという制約があり、両トランシーバの間に障害物がある場合や、別室に受信側トランシーバを設置した場合には、光を伝送できず、音楽を楽しむことができないという問題点があった。

【0010】この発明は、上記のような問題点を解消するためのなされたもので、コンパクトディスクプレーヤ(以下、CDプレーヤーという)、デジタルオーディオ

テープレコーダ(以下、DATという)等の、デジタル音楽信号を使用する一般のデジタルオーディオ機器またはISDN回線と接続でき、送信側から電波の届く範囲、例えば100~200m以内であれば別室や屋外であっても自由に受信側を設置し、高品質の音楽を楽しむことができ、また移動しながら音楽を楽しむことができるデジタルコードレス電話機を得ることを目的としている。

【0011】

10 【課題を解決するための手段】この発明に係るデジタルコードレス電話機は、オーディオ機器またはISDN回線からのデジタル音楽信号が入力されるデジタル音楽信号入力部と、このデジタル音楽信号入力部からのデジタル音楽信号を時分割し、定型のバースト信号に変換する第1の時分割多重処理部と、この第1の時分割多重処理部によるバースト信号を無線信号に変調する変調部と、この変調部に接続され無線信号を送信する第1のアンテナと、前記第1の時分割多重処理部および前記変調部を制御する第1の制御部とを親機または子機に備え、前記第1のアンテナから送信された無線信号を受信する第2のアンテナと、この第2のアンテナに接続され、無線信号をバースト信号に復調する復調部と、この復調部により復調されたバースト信号を元のデジタル音楽信号に変換する第2の時分割多重処理部と、この第2の時分割多重処理部によるデジタル音楽信号を外部のオーディオ機器へ出力するデジタル音楽信号出力部と、前記復調部および前記第2の時分割多重処理部を制御する第2の制御部とを子機または親機に備え、親機と子機の間または複数の子機間でデジタル音楽信号を伝送するものである。

20 30 【0012】また、オーディオ機器またはISDN回線からのデジタル音楽信号が入力されるデジタル音楽信号入力部と、このデジタル音楽信号入力部からのデジタル音楽信号を時分割し、定型のバースト信号に変換する第1の時分割多重処理部と、この第1の時分割多重処理部によるバースト信号を無線信号に変調する変調部と、この変調部に接続され無線信号を送信する第1のアンテナと、前記第1の時分割多重処理部および前記変調部を制御する第1の制御部とを親機または子機に備え、前記第1のアンテナから送信された無線信号を受信する第2のアンテナと、この第2のアンテナに接続され、無線信号をバースト信号に復調する復調部と、この復調部により復調されたバースト信号を元のデジタル音楽信号に変換する第2の時分割多重処理部と、この第2の時分割多重処理部によるデジタル音楽信号をアナログ音楽信号に変換するデジタル-アナログ変換部と、このデジタル-アナログ変換部によるアナログ音楽信号を音声として出力する音声発生部と、前記復調部および前記第2の時分割多重処理部を制御する第2の制御部とを前記子機または前記親機に備え、前記親機と前記子機の間または複数の子機間でデジタル音楽信号を伝送し、音声を出力するも

のである。

【0013】また、上記子機または親機に、上記デジタル・アナログ変換部と上記音声発生部との間にイヤホン接続部を設け、上記音声発生部としてイヤホンを用いたものである。

【0014】さらに、上記子機または上記親機に、受話部と、上記第2の時分割多重処理部によるデジタル音楽信号の出力を前記受話部または上記第2のデジタル音楽信号出力部へ切り替えるスイッチ部と、このスイッチ部を操作する操作部とを備えたものである。

【0015】また、上記子機または親機に、受話部と、上記第2の時分割多重処理部によるデジタル音楽信号の出力を前記受話部または上記音声発生部へ切り替えるスイッチ部と、このスイッチ部を操作する操作部とを備えたものである。

【0016】

【作用】この発明におけるデジタルコードレス電話機は、親機または子機で、オーディオ機器またはISDN回線からのデジタル音楽信号を第1のデジタル音楽信号入力部、第1の時分割多重処理部、変調部により所定の信号処理を行い、第1のアンテナから子機または親機へ無線信号として送信し、この無線信号を第2のアンテナで受信した子機または親機では復調部、第2の時分割多重処理部により所定の信号処理を行い、第2のデジタル音楽信号処理部からデジタル音楽を外部のオーディオ機器へ出力することによって、外来ノイズに強く、信号の減衰による音声劣化の少ない音楽信号の伝送を行う。

【0017】子機または親機の第2の時分割多重処理部からの音楽信号をデジタル・アナログ変換部によりアナログ音楽信号に変換し、音声発生部から出力することによって、音楽源のオーディオ機器またはISDN回線から離れた場所で明晰な音楽の出力を行う。さらに、子機または親機にイヤホン接続部を設け、イヤホンを用いることにより、イヤホンから明晰な音を聴く。また、操作部によりスイッチ部を操作し、受話部または第2のデジタル音楽信号出力部へデジタル音楽信号を出力することにより、音楽信号の出力経路を選択する。さらに、操作部によりスイッチ部を操作し、受話部または音声発生部へデジタル音楽信号を出力することにより、音楽信号の出力経路を選択する。

【0018】

【実施例】

実施例1. 図1はこの発明の一実施例を示すデジタルコードレス電話機のブロック図である。図において、24は公衆回線と接続する親機で、25はISDN回線との接続部、26はアナログ回線との接続部、27はISDN回線との同期をとってデータの入出力を行うISDNインターフェース回路、28はアナログ音声信号とデジタル信号の変換を行うコーデック、29はデジタルオーディオ機器（後述）からのデジタル音楽信号入力部であ

る。

【0019】30は内部クロックとの同期合わせをするデジタル音楽信号インターフェース回路、31はこれらのデジタル信号を無線伝送するために必要な所定のバースト信号に変換するため時分割多重化を行う時分割多重処理回路（以下、TDMA回路という）である。32はTDMA回路31やバースト信号と無線信号の変復調を行う無線通信部33（以下、RF部という）のチャンネル設定等を制御するCPU、34は無線信号を送受信するアンテナである。35はCDプレーヤやDAT等のデジタル音楽信号出力部36を有するデジタルオーディオ機器である。

【0020】37は子機であり、通常の通話に使用し、受話器を示すレシーバ38、マイク39、受信したデジタル音楽信号を出力するデジタル音楽信号インターフェース回路40とそのデジタル音楽信号出力部41を有し、他には親機24と同様にコーデック42、時分割多重処理回路43（以下、TDMA回路という）、CPU44、無線通信部45（以下、RF部という）、アンテナ46を有する。47はオーディオアンプ装置で、デジタル音楽信号入力部48を有し、内部にデジタル/アナログ変換回路49（以下、D/A変換回路という）と増幅回路50を有し、スピーカ51が外部に接続される。このオーディオアンプ装置47およびスピーカ51は上記の各回路を内蔵していれば市販品を用いてもよい。

【0021】なお、図中各ブロック間の二重線、単線、矢印はそれぞれアナログ信号、デジタル信号、制御信号の入出力経路を示す。また、TDMA回路31は第1の時分割多重処理部、RF部33は変調部、アンテナ34は第1のアンテナ、CPU32は第1の制御部、アンテナ46は第2のアンテナ、RF部45は復調部、TDMA回路43は第2の時分割多重処理部、CPU44は第2の制御部を示す。

【0022】次に、動作について説明する。デジタルオーディオ機器35のデジタル音楽信号出力部36から出力されたデジタル音楽信号は、親機24のデジタル音楽信号入力部29に入力され、デジタル音楽信号インターフェース回路29で一旦蓄積され、同期を合わせて逐次TDMA回路31へ転送される。ここで、無線伝送の為に所定のレートに速度変換して時分割バースト信号の形に成形されてRF部33へ送られ、ここで変調しアンテナ34から子機37へ無線電波で送信される。

【0023】次に、子機37ではアンテナ46でこの無線電波を受信してRF部45でデジタル信号に復調し、TDMA回路43で時分割されている音楽信号を連続信号に戻して、デジタル音楽信号インターフェース回路40へ送り、本来のデジタル音楽信号の形に変換する。そして、デジタル音楽信号出力部41から出力して、接続したデジタル音楽信号入力部48付オーディオアンプ47へ出力され、その内部のD/A変換回路49で初めて

アナログ信号に変換され、増幅回路50で増幅した後、スピーカ51から音楽を発生する。なお、CPU32、44はそれぞれTDMA回路31、43の制御を行い、バースト信号の時間スロットへの割付を定める。また、RF部33、45の制御も行い無線チャネルの設定やフェージングの検出を行っている。

【0024】次に、デジタル音楽信号インターフェース回路30の詳細な動作について説明する。CD、DATのデジタル信号のレートは数十Mbpsと高速であるが、デジタルコードレス電話機で伝送可能な信号レートは1スロット当り32Kbpsである。従って、デジタル音楽信号インターフェース回路30内で信号レートを変換する必要がある。例えば、デジタル音楽信号入力部29から入力された信号は、差分をとることでデータ量を圧縮したり、サンプルレート周波数変換器(f sコンバータ)でサンプル周波数を落して音質を劣化させない範囲でサンプリングを間引く等の方法で伝送データ量を縮小する。この処理は、デジタル音楽信号インターフェース回路30内で行われ、32Kbpsのデジタル信号としてTDMA回路31へ送られる。

【0025】さらに特徴的な動作としては、左右チャネルの識別がある。デジタルオーディオ機器35からの音楽信号はステレオ信号であり、左右2チャネルのデータが、交互にシリアルデータとして入力される。従って、どこからどこまでが左チャネルの信号で、次の右チャネルに信号はどこまでなのかが分からないと正確なステレオ音楽を再現できない。この左右チャネルの識別信号は、音楽信号に同期してオーディオ機器から与えられるので、デジタル音楽信号インターフェース回路30ではこれを検出し、圧縮した音楽信号に識別信号を付してTDMA回路31へ伝送する。

【0026】この識別信号は、音楽信号とは別に制御情報として送り、バースト毎に制御情報ビットの中に挿入して無線区間の伝送を行う方法、および音楽信号の中に、左または右チャネルの信号の先頭に識別子ビットを挿入する方法とが考えられる。受信する子機37のデジタル音楽信号インターフェース回路40では、この識別子を元に左右チャネルの信号を検出してそれぞれ分離して元どおりの形に再生し、デジタル音楽信号としてデジタル音楽信号出力部41より出力する。

【0027】以上のようにして、デジタルオーディオ機器35からの音楽信号を、デジタル信号のまま子機37に接続したオーディオアンプ装置20に伝送でき、途中ノイズの混入等音質の劣化がないので、クリアな音楽を聴くことができる。なお、音源としては、音声合成IC等を特別にデジタルコードレス電話機に内蔵するものではなく、CDプレーヤやDAT等、通常市販されているデジタルオーディオ機器を想定している。また、親器24と子機37の間の伝送は無線信号、特に小電力無線設備や無線LAN用に開放されている1~3000MHz

のHF、VF、UHF帯無線周波数を利用することを想定し、同じ電磁波でもより周波数が高くて設備が高価となるミリ波帯や全く伝送性質の異なる光による伝送方式は除外したものである。

【0028】実施例2. なお、実施例1では、親機24に直接デジタルオーディオ機器35を接続する場合について説明したが、図1の構成において、ISDN回線経由で伝送されてきたデジタル音楽信号を子機37に接続したスピーカ51から音声出力してもよい。この場合、ISDN回線接続部25から入力されたデジタル音楽信号はインターフェース回路27でタイミングを合わせてTDMA回路31へ入力され、以降は実施例1と同様の手順で子機37へ伝送され、スピーカ51から音声出力する。

【0029】このように構成すれば、従来技術で述べたオフトーク音楽端末のように専用の音源とその制御部を設けなくとも、回線を介して直接音楽を伝送できる。また、ISDN回線および親機24子機37間の無線区間は多重化により2回線分の信号を同時に伝送することも可能であるので、音楽信号は前述のようにデジタル音楽信号インターフェース回路40を介して外部のスピーカ51へ送って音楽を鳴らしながら、音声信号はTDMA回路43で分離されてコーデック42へ出力し、アナログ変換してレシーバ39を駆動して発生させることができる。

【0030】一方、マイク39からの音声はコーデック42でデジタル信号に変換されてTDMA回路43へ送られ、前述した音楽信号と逆の経路をたどってISDN回線接続部25からISDN回線へ送出される。このように、多重化して同期伝送することで、音楽を聴きながら通話をしたり、音声サービスを受けることができる。

【0031】実施例3. 上記実施例1、2では、子機37にデジタル音楽信号出力部41を設けたものを示したが、子機内にD/A変換器49と増幅回路50とスピーカ51を内蔵すれば、携帯性に優れ、移動が自由に行え、音楽発生の可能な子機を得ることができる。この場合の子機内部のブロック図を図2に示す。動作については、上記実施例1、2と同様にアンテナ46で受信した無線信号がRF部45、TDMA回路43、D/A変換回路49、増幅回路50で信号処理され、スピーカ51から音声が発生する。

【0032】実施例4. 上記実施例3では、スピーカ51を内蔵したものを示したが、スピーカ51を内蔵する代わりに、イヤホンジャックを設ければ、携帯性や移動性を損なわず、かつ周囲の人に迷惑をかけずに自分だけで音楽を楽しむことができる。この子機のブロック図を図3に示す。図において、52がイヤホンジャック、53がイヤホン、54が接続ケーブルである。動作については、増幅回路50から出力されたデジタル音楽信号がイヤホンジャック52、接続ケーブル54を付し、イヤ

ホン53から音声出力される。

【0033】実施例5. 上記実施例3ではスピーカ51から音楽を発生するものを示したが、切替スイッチによってスピーカ51だけでなく、レシーバ38へも音楽を流してもよく、周りの人に気がねなく音楽を楽しむことができる。この子機のブロック図を図4に示す。図において、55はスピーカ51またはレシーバ38から音楽を発生するか否かを指示する操作部であり、ボタン等からなる。56は増幅回路50とスピーカ51の間の設けられ、操作部55からの指示によってオン・オフするスイッチ回路。57はコーデック42とレシーバ38の間に設けられ、操作部55からの指示によってオン・オフするスイッチ回路である。

【0034】動作については、操作部55を操作し、CPU44へスイッチ回路56、57のオンまたはオフを指示する。例えば、スピーカ51から音声を発生させるときは、スイッチ回路56をオンし、スイッチ回路57をオフする。また、レシーバ38から音声を発生させるときは、スイッチ回路56をオフし、スイッチ回路57をオンする。なお、このスイッチ回路56、57をTDMA回路43内の回路に設け、信号出力を停止するようにし、上記と同様にスピーカ51への音楽信号送出を制御してもよい。

【0035】なお、上記実施例1〜5については、親機24から子機37へ、デジタルオーディオ機器35からのデジタル音楽信号を伝送し、音声を発生するものを示したが、子機から親機へ、または子機から子機へデジタル音声信号を伝送し、音楽を発生させてもよい。例えば、伝送元の子機にはデジタルオーディオ機器35、デジタル音楽信号入力部29を設け、デジタル音楽信号をデジタル音楽信号インターフェース回路に入力し、伝送先の親機または子機にはデジタル音楽信号インターフェース回路、デジタル音楽信号出力部41を設け、D/A変換回路49、増幅回路50、スピーカ51を設置し、スピーカ51から音楽を発生させる。また、イヤホン53やスイッチ回路56、57等についても実施例4、5と同様に伝送先に設置する。

【0036】

【発明の効果】以上のように、この発明によれば、デジタルオーディオ機器またはISDN回線からデジタル音楽信号を親機または子機に入力し、各種信号処理により子機または親機へ無線伝送し、そのデジタル音楽信号を外部のオーディオ機器へ出力するようにしたので、音質劣化の少ない音声信号の伝送が行え、親機または子機からの無線信号を受信できる場所であれば自由に子機または親機を設置でき、接続したオーディオ機器から高音質の音楽を鑑賞できるという効果がある。

【0037】また、子機または親機で無線信号を受信し、第2の時分割多重処理部から送出されたデジタル音楽信号をデジタルアナログ変換部によりアナログ音楽

信号に変換し、音声発生部から音声を出力するようにしたので、無線信号を受信できる範囲内であれば、自由に子機または親機を設置でき、音声発生部から高音質の音楽を鑑賞できる効果がある。

【0038】さらに、子機または親機イヤホン接続部を設け、イヤホンを接続し音声を出力するようにしたので、イヤホンから高音質の音楽を鑑賞でき、また、子機については無線信号を受信できる範囲内であれば、子機を持ち運びながらイヤホンを聴くことができ、携帯性を持たせることができるという効果がある。

【0039】また、子機または親機で、操作部によりスイッチ部を操作し、デジタル音楽信号の受話部または第2のデジタル音楽信号出力部へデジタル音楽信号を出力するようにしたので、用途に応じて音楽の出力部を選択することができ、利便性が向上するとともに、受話部を選択した場合、周囲に音楽を漏らさずに聴くことができるという効果がある。

【0040】また、子機または親機で、操作部によりスイッチ部を操作し、デジタル音楽信号の出力を受話部または音声発生部へデジタル音楽信号を出力するようにしたので、用途に応じて音楽の出力部を選択することができ、利便性が向上するとともに、受話部を選択した場合には、周囲に音楽を漏らさずに聴くことができ、音声発生部を選択した場合には、周囲に明晰な音楽を出力できるという効果がある。

【図面の簡単な説明】

【図1】この発明の一実施例によるデジタルコードレス電話機のブロック図である。

【図2】この発明の他の実施例を示すデジタルコードレス電話機のブロック図である。

【図3】この発明の他の実施例を示すデジタルコードレス電話機のブロック図である。

【図4】この発明の他の実施例を示すデジタルコードレス電話機のブロック図である。

【図5】従来のオフトーク音楽受信端末のブロック図である。

【図6】従来の時分割多重光空間デジタル信号伝送装置のブロック図である。

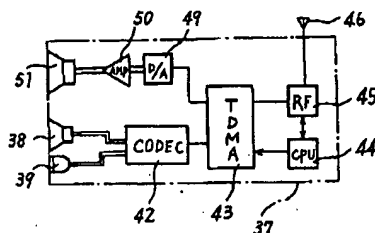
【符号の説明】

- 24 親機
- 29 デジタル音楽信号入力部
- 30 デジタル音楽信号インターフェース回路
- 31 時分割多重処理回路
- 32 CPU
- 33 無線通信部
- 34 アンテナ
- 35 デジタルオーディオ機器
- 37 子機
- 38 レシーバ
- 40 デジタル音楽信号インターフェース回路

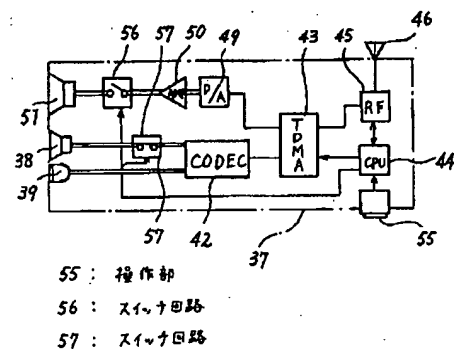
1 2

- 45 無線通信部
46 アンテナ
51 スピーカ

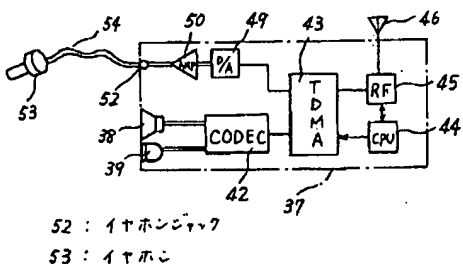
【図2】



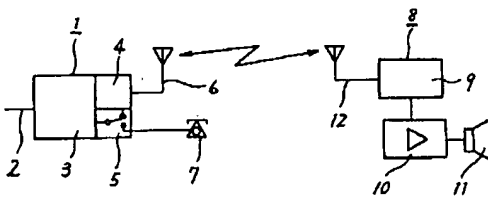
【図4】



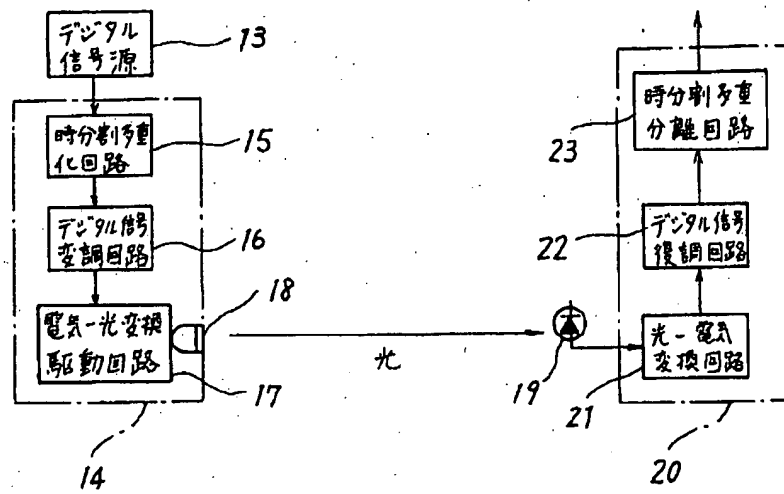
【図3】



【図5】



【図6】



【手続補正書】

【提出日】平成6年2月9日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】0006

【補正方法】変更

【補正内容】

【0006】次に、図6を用い、時分割多重光空間デジタル信号伝送装置の動作について説明する。前述の従来例では、無線信号はアナログ音楽信号をFM変調したものであったが、本例はデジタル信号のまま光を用いて無線伝送するものである。デジタル信号源13から発生する音楽信号は、送信側トランシーバ14において一定の形式に則って時分割多重化回路15で時分割多重化され、デジタル信号変調回路16で伝送に必要な信号形式に変調された後、電気-光変換駆動回路17で電気-光変換され、発光器18から光信号として空間に送出する。

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0010

【補正方法】変更

【補正内容】

【0010】この発明は、上記のような問題点を解消するためになされたもので、コンパクトディスクプレーヤ（以下、CDプレーヤーという）、デジタルオーディオテープレコーダ（以下、DATという）等の、デジタル音楽信号を使用する一般のデジタルオーディオ機器またはISDN回線と接続でき、送信側から電波の届く範囲、例えば100～200m以内であれば別室や屋外で

あっても自由に受信側を設置し、高品質の音楽を楽しむことができ、また移動しながら音楽を楽しむことができるデジタルコードレス電話機を得ることを目的としている。

【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0017

【補正方法】変更

【補正内容】

【0017】子機または親機の第2の時分割多重処理部からの音楽信号をデジタル-アナログ変換部によりアナログ音楽信号に変換し、音声発生部から出力することによって、音楽源のオーディオ機器またはISDN回線から離れた場所で明晰な音楽の出力を行う。さらに、子機または親機にイヤホン接続部を設け、イヤホンを用いることにより、イヤホンから明晰な音楽を聴く。また、操作部によりスイッチ部を操作し、受話部または第2のデジタル音楽信号出力部へデジタル音楽信号を出力することにより、音楽信号の出力経路を選択する。さらに、操作部によりスイッチ部を操作し、受話部または音声発生部へデジタル音楽信号を出力することにより、音楽信号の出力経路を選択する。

【手続補正4】

【補正対象書類名】明細書

【補正対象項目名】0027

【補正方法】変更

【補正内容】

【0027】以上のようにして、デジタルオーディオ機器35からの音楽信号を、デジタル信号のまま子機37

に接続したオーディオアンプ装置20に伝送でき、途中ノイズの混入等音質の劣化がないので、クリアな音楽を聴くことができる。なお、音源としては、音声合成IC等を特別にデジタルコードレス電話機に内蔵するものではなく、CDプレーヤやDAT等、通常市販されているデジタルオーディオ機器を想定している。また、親機24と子機37の間の伝送は無線信号、特に小電力無線設備や無線LAN用に開放されている1~3000MHzのHF, VF, UHF帯無線周波数を利用することを想定し、同じ電磁波でもより周波数が高くて設備が高価となるミリ波帯や全く伝送性質の異なる光による伝送方式は除外したものである。

【手続補正5】

【補正対象書類名】明細書

【補正対象項目名】0032

【補正方法】変更

【補正内容】

【0032】実施例4. 上記実施例3では、スピーカ51を内蔵したものを示したが、スピーカ51を内蔵する代わりに、イヤホンジャックを設ければ、携帯性や移動性を損なわず、かつ周囲の人に迷惑をかけずに自分だけで音楽を楽しむことができる。この子機のブロック図を図3に示す。図において、52がイヤホンジャック、53がイヤホン、54が接続ケーブルである。動作については、TDMA回路43から出力されたデジタル音楽信号がD/A変換回路49、増幅回路50で信号処理さ

れ、イヤホンジャック52、接続ケーブル54を通じて、イヤホン53から音声出力される。

【手続補正6】

【補正対象書類名】明細書

【補正対象項目名】0038

【補正方法】変更

【補正内容】

【0038】さらに、子機または親機にイヤホン接続部を設け、イヤホンを接続し音声出力するようにしたので、イヤホンから高音質の音楽を鑑賞でき、また、子機については無線信号を受信できる範囲内であれば、子機を持ち運びながらイヤホンを聴くことができ、携帯性を持たせることができるという効果がある。

【手続補正7】

【補正対象書類名】明細書

【補正対象項目名】0039

【補正方法】変更

【補正内容】

【0039】また、子機または親機で、操作部によりスイッチ部を操作し、受話部または第2のデジタル音楽信号出力部へデジタル音楽信号を出力するようにしたので、用途に応じて音楽の出力部を選択することができ、利便性が向上するとともに、受話部を選択した場合、周囲に音楽を漏らさずに聴くことができるという効果がある。